



2006-2012 ACTION PLAN

QUÉBEC AND CLIMATE CHANGE  
A Challenge for the Future



JUNE 2008



Québec 



## A MESSAGE FROM THE PREMIER



Climate change will have significant impacts on our societies and the ecosystems in which we live. States will be forced to ensure that their economies emit less carbon as they face growing international competition. From this perspective, states and societies that succeed in moving to the new emerging economy will be more able to fully participate in mitigating climate change while maintaining prosperity. Québec is determined to respond to the many challenges generated by such change and it will do so by developing in a sustainable manner.

In June 2006, Québec confirmed its leadership ambitions in the area of continent-wide sustainable development when it released its 2006-2012 Action Plan on climate change. Today, we move forward in this direction by adding funds and measures to the Action Plan, ensuring that Québec will contribute to the objectives of the Kyoto Protocol.

Through this revised Action Plan that follows The Sustainable Development Act, The Québec Energy Strategy 2006-2015 and The Québec Public Transit Policy, the government means to build a Québec that is concerned about both the welfare of current generations and the development of the generations to come.

### An exemplary contribution

Québec can already be proud of leading the way in Canada with respect to per-capita greenhouse gas emissions. This achievement is founded on the excellent performance of our manufacturing sector, a more intensive utilisation of public transit, a motor vehicle fleet that consumes less energy and by the preponderance of clean and renewable energy from sources such as hydroelectricity and wind turbines in Québec's energy profile.

Every single Quebecer can be proud of the exemplary contribution Québec has made towards making our planet greener both today and for future generations by setting our sights on the goal of sustainable development.

Climate change is incontestably the greatest environmental challenge Earth has ever faced. To overcome it, we all need to do our share, and this idea truly forms the basis of our ambitious Action Plan that has been called the most ambitious in North America by many environmental groups and that has inspired other states and provinces to join in this collective effort.

### En route to the future

Entitled *Québec and Climate Change – A Challenge for the Future*, this Action Plan clearly describes the behavioural changes that will be necessary to ensure prosperity for present and future generations. It calls upon Québec society as a whole to respond, because this issue is of concern as much to individual citizens as to organizations and enterprises. The success of our efforts is contingent on our common actions, and I have confidence in our ability to rise to the occasion.

The Premier of Québec,

A handwritten signature in blue ink that reads "Jean Charest". The signature is stylized and cursive.

Jean Charest



## A MESSAGE FROM THE MINISTER



In June 2006, Québec for the first time adopted an Action Plan on climate change that set ambitious goals and made available the means to materialize them. The development of this far-reaching Action Plan took place under the leadership of then Minister of Sustainable Development, Environment and Parks, Claude Bécharé.

### Québec in the forefront

The *2006-2012 Climate Change Action Plan: Québec and Climate Change* marked an important step in the action undertaken by our government towards building a society in which sustainable development is at the heart of our priorities and collective choices.

Government is now moving forward on this path by improving its Action Plan with new measures and additional funding. The revised Action Plan will allow Québec to remain a North American leader in the fight against climate change.

### Precise targets and clearly defined means

The Action Plan includes precise targets and sets out the initiatives that will achieve them. Between today and 2012, we want Québec to succeed in reducing its greenhouse gas emissions to 6% below 1990 levels. The Government of Québec Action Plan anticipates reducing GHG emissions by 14.6 megatons by 2012; it is one component of a series of factors that will determine average emission levels achieved by Québec between 2008 and 2012.

In addition to our government's efforts, contributions will be made by the federal government, industry and municipalities. Together, these efforts and the mobilization of the citizenry will help Québec meet the goals of the Kyoto Protocol.

The implementation of the Action Plan can count on overall resources of 1.55 billion dollars over six years, or an average of 250 million dollars each year. These amounts come mainly from gasoline and fossil fuel duty and represent a first in North America. Québec premier Jean Charest has obtained an additional 350 million dollar federal contribution from the Trust fund for clean air and climate change. Québec now has the means to implement the Action Plan, which in conjunction with the new Québec Energy Strategy and The Québec Public Transit Policy that were unveiled in 2006 make up the solid structural basis for moving forward with sustainable development.

### Action is urgently needed

While some may be tempted to abandon the fight due to the enormity of the challenge, we believe to the contrary that concrete measures must be taken right now while establishing a solid foundation for long-term action. Quebecers can all count on their government to encourage and support their efforts. Québec needs to marshal its forces immediately and act to ensure that the generations of today and tomorrow succeed in overcoming one of the greatest environmental challenges of all time.

Minister for Sustainable Development,  
Environment and Parks,

A handwritten signature in black ink that reads "Line Beauchamp".

Line Beauchamp



## NOTICE TO READER

The 2006-2012 Québec Action Plan on Climate Change, unveiled in June 2006, now benefits from additional funding that has made it possible to improve on its measures. This report is an update of the plan.

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THE FIGHT AGAINST CLIMATE CHANGE REQUIRES US TO OVERCOME IMMENSE CHALLENGES IF WE WANT TO LIVE IN A HEALTHY ENVIRONMENT, BREATHE CLEAN AIR AND ENSURE THAT OUR CHILDREN INHERIT THIS SAME RIGHT. IMPLEMENTING THE KYOTO PROTOCOL IMPOSES DISCIPLINE AND PERSEVERANCE ON US IF WE WANT TO ACHIEVE ITS OBJECTIVES. WE ARE BOTH INDIVIDUALLY AND COLLECTIVELY PART OF THIS FIGHT THAT MUST BE WON TO MAKE CERTAIN THAT CURRENT AND FUTURE GENERATIONS ENJOY A GOOD QUALITY OF LIFE.

THIS FIGHT DEMANDS IMMEDIATE, CONCERTED ACTION. EVERY ONE OF OUR ACTS MAKES A DIFFERENCE IN ENSURING THAT WE CAN ACHIEVE THE QUALITY OF LIFE WE ASPIRE TO, SAFEGUARD OUR ECOSYSTEMS, PROTECT OUR INFRASTRUCTURES AND KEEP OUR ECONOMY COMPETITIVE. THIS RESPONSIBILITY FALLS NOT ONLY TO HEADS OF STATE AND THE SCIENTIFIC COMMUNITY, BUT ALSO TO EVERY INDIVIDUAL, INSTITUTIONS AND ENTERPRISES THAT TOGETHER MAKE UP OUR SOCIETY.

QUÉBEC ALREADY SHOWS EXEMPLARY BEHAVIOUR IN THE AREA OF LIMITING GREENHOUSE GAS (GHG) EMISSIONS, THANKS IN LARGE PART TO ITS MASSIVE INVESTMENT IN THE PRODUCTION OF CLEAN ENERGY IN THE FORM OF ELECTRICITY. THE REVISED 2006–2012 ACTION PLAN ALLOWS QUÉBEC TO RESOLUTELY MAINTAIN ITS SUSTAINABLE DEVELOPMENT LEADERSHIP IN CANADA AND THROUGHOUT NORTH AMERICA BY PROVIDING THE MEANS TO REDUCE ITS GHG EMISSIONS AND ADAPT TO CLIMATE CHANGE.

# 1. QUÉBEC'S CONTRIBUTION TO MEETING A GLOBAL CHALLENGE



Source : Ministère des Ressources naturelles et de la Faune



Source : Ministère des Ressources naturelles et de la Faune

## 1.1

# CLIMATE CHANGE: THE GREATEST ENVIRONMENTAL CHALLENGE EVER FACED BY OUR PLANET

### 1.1.1 Impacts of concern

According to the best estimates of the Fourth Report of the Intergovernmental Panel on Climate Change (IPCC)<sup>1</sup> published in 2007, average air temperature near the surface of Earth will increase from 1.8 to 4 degrees Celsius between now and 2100 across the planet. The warming effect will be at its maximum in the centre of landmasses and at the highest North American latitudes in winter. We will witness increased precipitations at high latitudes and increased frequency or intensity of extreme meteorological phenomena such as heat waves, torrential rain and drought. Average levels and acidity of oceans are also expected to rise, while snow and sea ice cover will shrink in both hemispheres.

Québec can expect warming throughout its territory with accentuation in the North and in winter. Some scientists predict that the Arctic Ocean will be free of ice in summer within a few years. Greater variation in precipitation patterns can also be anticipated over the entire territory and periods of crushing heat, drought, intense rain and winter warming may become more frequent.

Extra-tropical storm trajectories will extend further north and may strike some regions of Québec, a phenomenon that has already been seen in the 20<sup>th</sup> century. Finally, the expected rise in average ocean levels may aggravate the problem of coastal erosion.

Average temperatures already rose in the western and central parts of southern Québec by 0.75 to 1.25 degrees Celsius between 1960 and 2003. To the east, the rate of warming was less sustained with an average of less than 0.75 °C during the same period. In the North, the significant rise in temperature that has been observed since the 1990s has led to permafrost thaw that in turn threatens the traditional lifestyle of Aboriginals, population security and the integrity of infrastructures.

<sup>1</sup> Working group created jointly in 1988 by the United Nations and the World Meteorological Organization.



### 1.1.2 Limiting global warming

According to the 4<sup>th</sup> report of the IPCC, warming in excess of approximately 2 °Celsius throughout the planet compared to average 1980-1999 temperatures would have devastating effects on various systems and activities. What's more, certain ecosystems such as the tundra and the boreal forest and regions such as the Arctic have been acknowledged as being particularly vulnerable. These conclusions are very worrisome for Québec, which according to the projections will suffer a more accentuated warming than the one feared by the IPCC on a global scale, somewhere between 1.8 °C (optimistic scenario) and 4 °C (pessimistic scenario).

Since the beginning of this century, many governments have taken measures to reduce GHG emissions in order to avoid planet warming rising beyond 2 °C globally. Québec is highly favourable to such initiatives. However, given its northern location, the 2 °C threshold is already too high to halt major disturbances on its territory. It has become vital for us to use all available means to help limit climate warming as much as possible.

### 1.1.3 Protecting public security

Climate change threatens the safety of our citizens and the integrity of various infrastructures and buildings, especially in northern and coastal areas. It also threatens to erode and deteriorate our abundant natural resources and render ecosystems more fragile. Since anticipated Kyoto Protocol emission reductions will not suffice to sufficiently slow climate change, we in Québec have no choice but to put efficient adaptive measures in place.

## UNDERSTANDING THE IMPACT OF HUMAN ACTIVITY ON THE GREENHOUSE EFFECT

Certain naturally present gases in our atmosphere help retain the sun's heat near the surface of Earth. They are known as "greenhouse gases" or GHGs. Without their presence, the average temperature in the lower levels of the atmosphere would be approximately -18 °C instead of +15 °C, and life as we know it would be impossible. The so-called "greenhouse effect" is thus a very natural phenomenon and constitutes a major part of Earth's climate system.

However, over the course of the last 200 years, human activity has caused an increase in GHG emissions into the atmosphere with a resulting retention of a greater amount of energy near to Earth's surface and disturbance to our planet's system of climate equilibrium.

The main GHG given off by human activity is carbon dioxide (CO<sub>2</sub>). However, we also need to take into account methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O) and gases that were created by humans like hydrofluorocarbons, tetrafluorocarbons and sulphur hexafluoride.



## 1.2 THE KYOTO PROTOCOL: A NECESSARY FIRST STEP

Climate change affects every country and every state on our planet. What's more, confronting it requires concrete measures on international, national, regional, local and individual levels. The Kyoto Protocol has currently been ratified by 181 countries, including Canada. However, it is worth noting that many countries, including China and India, have not set restrictive reduction targets, which means that they have no quantitative commitments to lower GHG emissions. In addition, the United States, which is the second-largest GHG emitter, never ratified the Kyoto Protocol. Canada, for its part, ratified the Kyoto Protocol in 2002 and committed to an average GHG emission reduction of 6% below 1990 levels over the 2008-2012 period.

Since 1998, Québec has consistently been a strong supporter of the implementation of the Kyoto Protocol in Canada. To this effect, on November 28, 2006, the Assemblée nationale du Québec unanimously passed a motion approving the Kyoto Protocol. On December 5, 2007, the Government of Québec affirmed by decree that it was bound to the protocol and committed to implementing the protocol in its areas of jurisdiction, according to the terms of its 2006-2012 Action Plan on Climate Change.

Québec has also on many occasions called on the federal government to honour its Kyoto Protocol undertakings, notably through unanimously approved resolutions of the Assemblée Nationale du Québec, including the one passed on November 28, 2007.

Moreover, in the *New England Governors/Eastern Canadian Premiers Climate Change Action Plan 2001*, the Government of Québec committed to increased regional, national, and international collaboration in order to stabilize regional GHG emissions at 1990 levels by 2010 and lower them to 10% below 1990 levels by 2020.

Québec has also created new partnerships that will provide a better understanding of the phenomenon of planet warming and implement sustainable short, medium and long-term solutions in the fight against climate change. This is the context in which Québec in 2007 joined the Climate Group, an international organization dedicated to the promotion of Federated State and large multinational corporation action in the area of climate change. During the same year, Québec also became a member of the Climate Registry. More than 40 U.S., Mexican and Canadian States belong to the registry that eventually aims to become a component of a North American GHG emissions cap and trade market.





In April 2008, Québec became a member of the Western Climate Initiative (WCI), which is a grouping of North American states working together to implement a GHG emission cap and trade system for certain economic sectors that are heavy GHG emitters.

In June 2008, Québec, in conjunction with Ontario, also launched the Provincial and Territorial Greenhouse Gas Cap and Trade Initiative that will work to develop and implement a GHG cap and trade system, probably by 2010. This system will be set up in tandem with other regional plans currently under development, including the WCI project.

## THE UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE (UNFCCC)

Adopted in 1992, the UNFCCC sets up a global framework to tackle the challenge of climate change. The convention, to which 189 countries adhere, requires governments to inventory their GHG emissions, initiate national strategies to lower them and cooperate to prepare to adapt to the impacts of climate change.

The ultimate goal of the convention is to stabilize atmospheric GHG concentrations at a level that will prevent dangerous anthropogenic interference with the climate system. Some forty industrialized countries including Canada and the United States have signed on and committed to bring their 2000 GHG emissions back to 1990 levels.

## THE KYOTO PROTOCOL

At the time when governments adopted the United Nations Framework Convention on Climate Change they were already aware of the fact that this undertaking would not be enough to slow climate warming. This is why they adopted the Kyoto Protocol in 1997 as an appendix to the Convention.

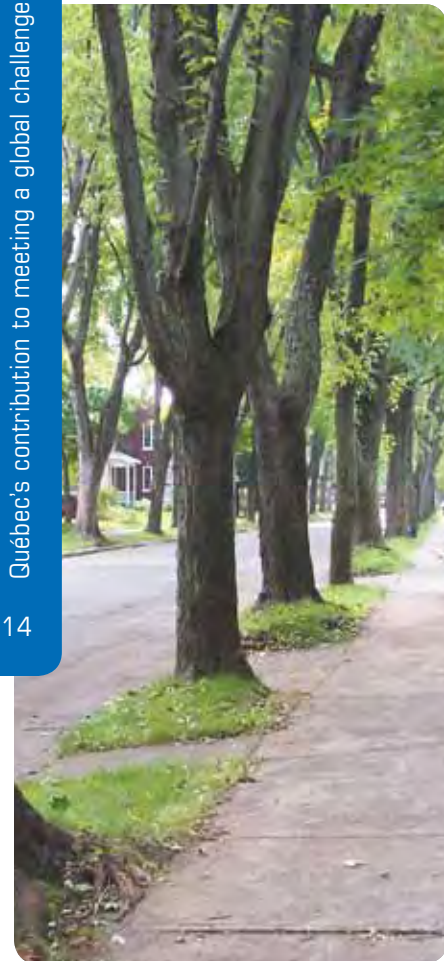
The Protocol shares the objectives of the Convention, while going further by spurring industrialized nations to commit to individual, legally binding objectives for reducing or limiting GHG emissions. The average goal to which the industrialized nations subscribed is to lower emissions to 5.2% beneath their 1990 level during the 2008-2012 period. Reduction targets vary from one country to another according to the principle of shared but differentiated responsibilities.



Source : Denis Bruneau © Le Québec en images, CCDMO



Source : Ministère des Ressources naturelles et de la Faune

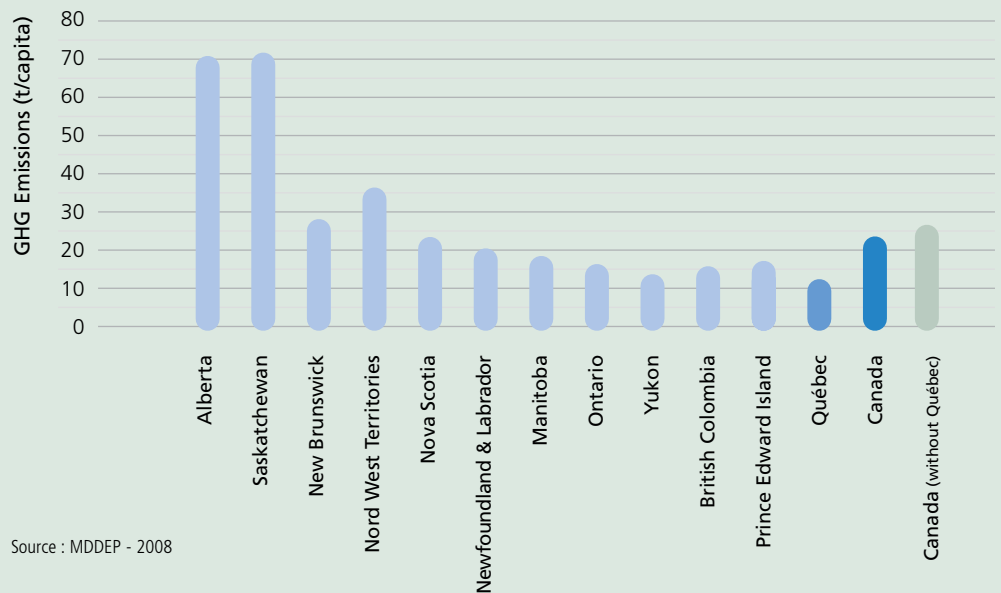


Source : Pierre Blais, urbaniste, MAMR

# 1.3 QUÉBEC'S GHG EMISSIONS: AN EXEMPLARY CONTRIBUTION

In absolute terms, Canada and Québec are hardly the most significant GHG emitters, internationally speaking, since they represent respectively only 2% and 0.2% of global greenhouse gas emissions. However, Canada has one of the highest per-capita emission rates in the world. This is why it is imperative to act without delay to reverse this trend and lead by example. With respect to GHG emissions, Québec had the best per-capita 2005<sup>2</sup> profile in Canada. Statistics confirm that **per-capita Québec emissions amounted to 12.1 tons of equivalent CO<sub>2</sub> (eq. t. CO<sub>2</sub>)** on average, compared to 23.1 tons for the whole of Canada. If Québec figures are excluded, the Canadian per-capita average would rise to 26.5 tons of equivalent CO<sub>2</sub>, and exceed the U.S. per-capita average of 24.6 tons. In 2005, Québec produced 92 million tons (92 Mt) of GHG, a 5.2% increase over 1990. However, between 2003 and 2005, Québec emissions dropped by 2%, while overall Canadian emissions continued to rise, reaching 734 megatons of GHG.

2005 PER-CAPITA GHG EMISSIONS BY PROVINCE / TERRITORY AND IN CANADA



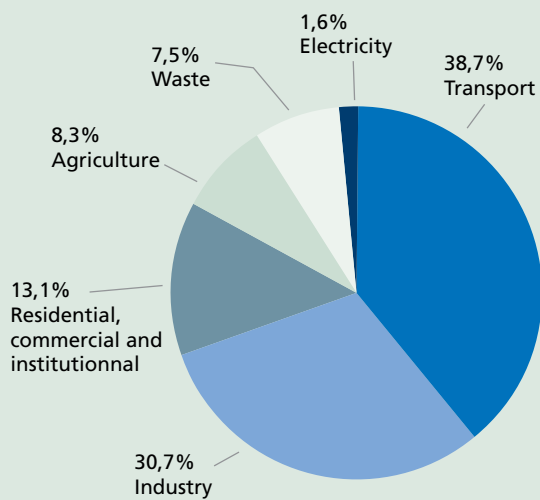
Source : MDDEP - 2008

Québec's performance level stems largely from the fact that in the past, Québécois decided to invest in a clean and renewable source of energy: hydroelectricity. Within Québec, electrical production accounts for only 1.6% of emissions and is thus our smallest source of GHG emissions while this sector remains in third place within Canada.

<sup>2</sup> Inventory of Québec greenhouse gas emissions in 2005 and their evolution since 1990



### BREAKDOWN OF GHG EMISSIONS BY SECTOR OF ACTIVITY IN QUÉBEC IN 2005



The excellent performance of the manufacturing sector has significantly contributed to Québec's positive GHG balance sheet. In fact, between 1990 and 2005, this sector lowered its overall emissions by 8.5% and its industrial process emissions by 14.3%. These gains stem from the strategic investments made by Québec enterprises in innovative technology that allowed them to improve their processes and their energy efficiency. Today, many of these enterprises are leaders in their field because they have improved their competitiveness while substantially reducing their GHG emissions.

Québec also stands out on our continent in the area of transportation. Its motor vehicle fleet is one of the best performers in Canada in terms of energy efficiency and Montréal remains one of the North American cities with the highest rates of use of public transit.

This enviable performance also means of course that further GHG emission reductions are a greater challenge for Québec than for the rest of Canada, because we have come so far already. Nevertheless, we need to pursue our efforts to reduce Québec GHG emissions; the magnitude of the climate change challenge necessitates contributions by everyone, throughout the world.



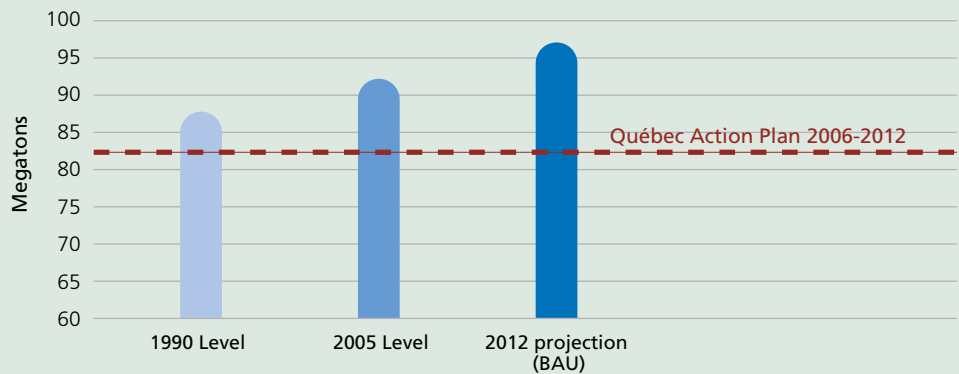
Source : Service des communications, © Le Québec en images, CCDMD

## 1.4 QUÉBEC IN THE FIGHT AGAINST CLIMATE CHANGE

Transportation and buildings are the two main sectors responsible for the growth in Québec emissions between 1990 and 2005. The plan aims principally at reversing the upward trend in these two sectors through undertakings that will allow the Québec economy to improve its competitiveness overall and wean itself off fossil fuel dependency. The revised 2006-2012 Action Plan aims to avoid and reduce Québec GHG emissions by 14.6Mt or 6% below 1990<sup>3</sup> levels by 2012, as the following graphic illustrates.

### GHG EMISSIONS

This



document presents measures to be accomplished between now and the end of 2012 as defined by two main goals:

1. Reducing or avoiding GHG emissions
2. Adapting to climate change.



Source : Réseau de transport de la Capitale

<sup>3</sup> Business as usual (BAU) predicts Québec GHG emissions of 96.9 megatons in 2012.





### 1.4.1 Reducing or avoiding GHG emissions

Over the course of the coming years, Québec will need to reduce its GHG emissions while maintaining a strong, sustainable economy, and profit as much as possible from new business opportunities related to the challenge of climate change. In a world where the cost of fossil fuel energy has increased greatly in the last few years, energy efficiency is not only advisable, it is an essential component of the competitiveness of our enterprises and of Québec's economy as a whole.

Energy also plays a major role in Québec's economy, allowing for wealth creation, stimulating investment and employment, generating tax revenues and contributing to the financial well-being and competitiveness of our enterprises. In fact, Quebecers' high standard of living is in part attributable to the excellent performance of our energy sector. The measures included in this Action Plan are thus complementary to those flowing from the Québec Energy Strategy.

Actions aimed at reducing GHG emissions mainly concern the energy, transportation, municipal, industrial, residual materials, agricultural and government activity sectors. Actions with respect to technological development (R&D) and public awareness will also lead to reductions in GHG emissions.

### 1.4.2 Adapting to climate change

Adaptive measures are grouped into health and public security, monitoring network, infrastructure in at-risk environments, forests and water and air management components. They will allow for the protection of the population, and the monitoring and protection of the environment, thus diminishing our vulnerability to the impact of climate change in certain sectors.

## AVOIDED EMISSIONS

The fight against climate change necessitates among other things the avoidance of new GHG emissions stemming from the production of electricity, heating buildings and industrial processes. In Canada, avoided emissions are calculated on the basis of equivalent energy produced by a natural gas combined-cycle gas turbine power plant (the most efficient type of fossil fuel thermal power plant) that generates an average of 350 CO<sub>2</sub> equivalent tons per gigawatt hour (GWh).



THE ACTION PLAN IS COMPOSED OF 26 MEASURES THAT REVOLVE AROUND TWO MAIN OBJECTIVES: REDUCING OR AVOIDING GHG EMISSIONS AND ADAPTING TO CLIMATE CHANGE. ACTIONS INTENDED TO REDUCE GHG EMISSIONS CONCERN THE ENERGY, TRANSPORTATION, MUNICIPAL, INDUSTRIAL, RESIDUAL MATERIALS, AGRICULTURE AND GOVERNMENT ACTIVITY SECTORS. THEY ALSO HAVE PUBLIC AWARENESS COMPONENTS AND SUPPORT TECHNOLOGICAL INNOVATION. MEASURES IN THE AREA OF ADAPTATION INVOLVE HEALTH AND PUBLIC SECURITY, THE ENVIRONMENT, NATURAL RESOURCES AND THE TERRITORY.

THE ACTIONS PRESENTED HERE WILL ALLOW QUÉBEC TO REDUCE ITS GHG EMISSIONS BY 14.6 MEGATONS OF EQUIVALENT CO<sub>2</sub> AND BRING ITS EMISSIONS TO 82.5 MEGATONS OF EQUIVALENT CO<sub>2</sub> BY 2012, WHICH IS 6% BELOW THE 1990 LEVEL. THIS CHALLENGE CAN BE MET IF ALL OF SOCIETY'S PLAYERS MOBILIZE TO ACT RIGHT AWAY.

FOR EACH SECTOR, THE GOVERNMENT PRESENTS A STATUS REPORT THEN REVEALS THE MEASURES (CONTAINED IN THE APPENDIX) THAT IT INTENDS TO IMPLEMENT BY 2012.

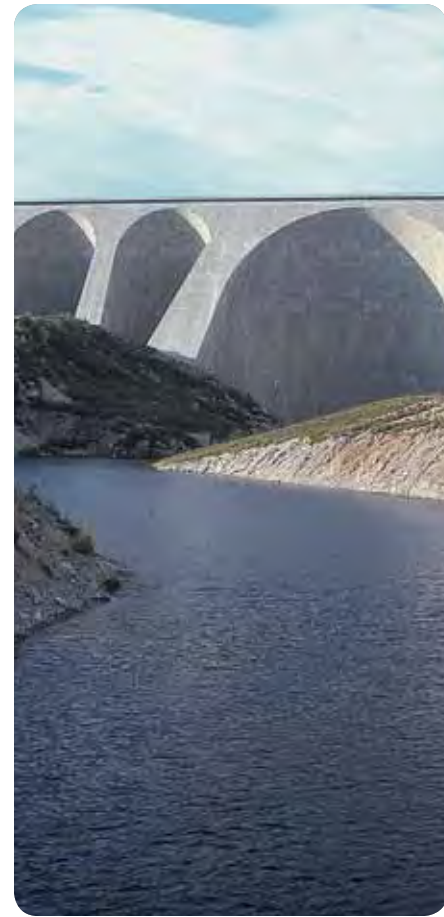
THE ACTION PLAN FLOWS FROM FOUR MASTER PRINCIPLES:

- QUEBEC'S TAKING RESPONSIBILITY IN ITS CONSTITUTIONAL AREAS OF JURISDICTION
- ECONOMIC EFFICACY TO PRESERVE THE COMPETITIVENESS OF QUÉBEC ENTERPRISES
- INTERVENTION COMPLEMENTARITIES TO MAXIMIZE POSITIVE EFFECTS
- COMMITMENT OF ALL PLAYERS IN QUÉBEC SOCIETY: ORDINARY CITIZENS, ENTERPRISES, MUNICIPALITIES AND PUBLIC INSTITUTIONS.

THE ACTIONS LAID OUT IN THIS PLAN TARGET QUÉBEC'S JURISDICTIONAL DOMAINS, I.E. ENERGY PRODUCTION, TRANSPORT AND DISTRIBUTION, ROAD TRANSPORTATION, MUNICIPALITIES, LANDFILL MANAGEMENT, AGRICULTURE, HEALTH, CIVIL PROTECTION, THE ENVIRONMENT, NATURAL RESOURCES AND TERRITORIAL PLANNING.

QUÉBEC WILL ALSO SPUR THE FEDERAL GOVERNMENT TO ACT IN ITS OWN AREAS IN WAYS THAT ARE COMPLEMENTARY TO THIS ACTION PLAN.

## 2. ACTIONS TO BE TAKEN BETWEEN 2006 AND 2012



Source : Jean-Guy Faucher, MRNF



Source : © Le Québec en images, CCDMD, Gaëtan Beaulieu



Source : © Le Québec en images, CCDMD, Denis Chabot

## 2.1 SECTORIAL ACTIONS TO REDUCE OR AVOID GHG EMISSIONS IN QUÉBEC

### 2.1.1 Energy

For more than 50 years, Québec has stood out by its know-how in the energy field through the development of its hydric resources. In 2005, the production of electricity in Québec generated considerably less GHG (1.6% of total emissions) than in Canada as a whole (17.4% of total emissions) where coal, oil and natural gas remain the principal energy sources. This situation can be explained by the fact that 96% of Québec's available electrical power comes from renewable sources. This proportion is one of the highest in the world and one of which Québec can be justly proud. However, this situation also means that it will be that much more difficult for Québec to reduce its GHG emissions.

In the light of its success, Québec intends to pursue the development of its hydroelectric potential, but also wishes to invest in new forms of renewable energy, and especially in wind energy, while underlining the need to lowering electrical consumption in all sectors of economic activity.

In 2005, hydrocarbon and coal GHG emissions in Québec amounted to 66.0 megatons or 71.7% of total GHG emissions. The transportation sector was responsible for 53.9% of this volume, while mining and manufacturing accounted for 19.3%, residential, commercial and institutional sub-sectors, 18.2% and energy distribution, transport and production, 7.7%.

In May 2006, the Government of Québec unveiled its energy strategy, entitled *Using Energy to Build the Québec of Tomorrow*. This strategy foresees new developments in renewable energy (hydroelectricity, wind energy and biomass) and seeks a more efficient utilisation of all forms of energy.

#### Hydroelectricity

Hydroelectricity is a clean and renewable climate-friendly energy source. Between 2006 and 2012, numerous major hydroelectric projects with a combined power of 1,895 MW will be placed into service. At term, these projects will allow for annual GHG emission savings of nearly 3 megatons.

Additionally, the Government of Québec plans to compile a 4,500 MW portfolio of further hydroelectric projects by 2010. The environmental evaluation process for the 1,500 MW Romaine complex has in fact already begun. At term, these projects will provide savings of nearly 8 megatons of GHG each year.



### Wind energy

Moreover, in order to take advantage of wind energy/hydroelectricity complementarities, the government has committed to the development of 4,000 MW of wind-generated electricity by 2015. The development of the first 3,000 MW was begun in 2003 through two public tenders. In the initial 1,000 MW call for tenders, 8 projects were selected for a total of 990 MW of power coming on line by 2012. Projects selected in the second call for tenders totalling 2 000 MW were announced in May 2008. In the spring of 2008, the government also announced two new public tenders of 250 MW each, reserved for Regional Municipal Counties (RMCs) and Aboriginal nations in partnership with the private sector. The development of this energy network will require nearly 6.5 billion dollars in investment over ten years and create 2,000 jobs while saving 2.9 Mt of GHG emissions annually. In addition, beyond 2015, and in keeping with technological progress in this field, the government will act to ensure that wind energy equivalent to 10% of new capacity will be developed for each added block of hydroelectric power.

In addition, a wind-diesel project will be developed in Nunavik along and wind-diesel systems implemented throughout autonomous networks that are not connected to the Hydro-Québec power grid. The required studies and technical measurements at two Nunavik sites are currently being completed and service is planned to begin in 2012. Hydro-Québec Distribution (HQD) is also working in collaboration with the Îles-de-la-Madeleine community council to prepare a wind-diesel pairing project on the territory presently served by the Cap-aux-Meules thermal power station.

### Biomass

With its vast forests, dynamic agriculture and many municipalities, Québec enjoys a wealth of residual biomass that is currently under-exploited. The valorization of this renewable biomass will not only produce energy but will also help lower Québec's dependence on petroleum products through the production of biofuel substitutes for fossil-based energy in industrial, residential, commercial and institutional heating and in transportation. In the new energy strategy, the government favours the valorization of residual biomass energy and plans to call for an initial 100 MW tender in 2008 as part of a total of 700 MW of biomass-generated energy.

### Energy efficiency

In addition to the production of renewable energy, Québec has also chosen the path of energy efficiency. It is a fact that Quebec consumes less energy per-capita than Canada as a whole or the United States, but it nevertheless remains an important energy consumer. Seen on the Canadian scale, Québec's energy choices contribute to avoiding the emission of significant amounts of GHG..

#### 2012 AVOIDED GHG EMISSIONS, BY ENERGY CATEGORY

Energy Category	2012 avoided GHG emissions
Hydroelectricity	3 megatons of equivalent CO <sub>2</sub>
Wind energy	2,9 megatons of equivalent CO <sub>2</sub>
Energy efficiency	3,0 megatons of equivalent CO <sub>2</sub>



By 2015, the energy strategy plans to generate additional electricity equivalent to that produced by Manic 5 without casting a single cubic metre of concrete or running a single drop of water through a turbine. The strategy sets three energy efficiency targets. Firstly, with respect to natural gas, the strategy has tripled objectives that will now rise from 96.9 million cubic metres in 2008 to 350 million in 2015. Similarly, Hydro-Québec's energy efficiency target moves from 4.1 terawatt hours by 2010 to 11 terawatt hours by 2015, equivalent to the combined annual household energy consumption for Québec City, Laval and Sherbrooke. Finally, for the first time, an energy savings target has been adopted in the petroleum products sector on the order of 2 megatons of oil equivalent by 2015, which equals 13.5 million barrels of oil or slightly more than 10% of Québec's annual consumption of petroleum products.

The government is going forward with an innovative master plan that covers all markets and all forms of energy, accompanied by the means to achieve the plan's goals. The Agence de l'efficacité énergétique began its hearings in April 2008 and should be in a position to make its final plan public before the end of the year.

In all, GHG emissions avoided through across-the-board energy efficiency in all sectors of electricity and natural gas will equal some three megatons in 2012.

#### MEASURE 1: IMPLEMENT A FINANCING PROGRAM AIMED AT ENERGY EFFICIENCY FOR INDIVIDUALS, INDUSTRIES, INSTITUTIONS, COMPANIES AND MUNICIPALITIES IN QUÉBEC

Total potential reduction and avoidance:	990 kilotons
Investment:	185 million dollars

Energy efficiency means reducing or avoiding the release of substantial quantities of GHG into the atmosphere and simultaneously realizing significant savings in the cost of energy. In spite of the advantages, some private individuals and company managers hesitate to apply energy efficiency measures due to self-set profitability criteria.

The Government of Québec will prepare a program for funding energy efficiency projects aimed at replacing warm forced air heating systems and hot water tanks for individuals, institutions, small, medium and large industries as well as stores and municipalities.

The government also intends to offer an intervention program aimed at improving cooling systems in the municipal (arenas and curling rinks), commercial (supermarkets) and industrial (warehousing and food industry) sectors.

#### THE AGENCE DE L'EFFICACITÉ ÉNERGÉTIQUE

The mission of the Agence de l'efficacité énergétique is, in a sustainable development perspective, to promote energy efficiency and the development of new energy technologies for all energy sources, in all activity sectors, for the benefit of the citizenry as a whole throughout Québec. The Agence is also mandated to prepare a global energy efficiency and new technology plan and to ensure its implementation and follow-up.



Finally, this measure will allow cross-sector implementation of a program targeting a reduction in fuel oil consumption through energy efficiency measures or converting equipment to cleaner alternatives such as natural gas and biomass. This program will be accompanied by a regulatory measure aimed at tightening fuel oil sulphur level standards. Sulphur content will be lowered from 2% to 1.5% by weight, throughout Québec. Wherever natural gas is available, the norm will drop to 1%. This measure will also help combat acid rain.

### CO<sub>2</sub> EMISSION FACTORS BY TYPE OF FOSSIL FUEL

Product	CO <sub>2</sub> emission coefficient
Propane	1,500 g/l
Natural Gas	1,891 g/m <sup>3</sup>
Gasoline	2,360 g/l
Diésel	2,730 g/l
Light heating oil	2,830 g/l
Heavy heating oil	3,090 g/l
Anthracite coal	2,390 g/kg
Canadian bituminous coal	2,249 g/kg
American bituminous coal	2,323 g/kg
Petroleum coke	3,190 g/kg

### MEASURE 2: AMEND QUÉBEC'S BUILDING CODE TO IMPROVE ENERGY PERFORMANCE OF NEW BUILDINGS AND HOMES BUILT IN QUÉBEC

Total potential reduction and avoidance: 50 kilotons  
Investment: zero

Current new building and home construction regulations are more than 20 years old and many provisions are out-of-date. In order to update its regulations, the Government of Québec will revise the code to include new energy performance requirements that will apply to all new buildings and homes constructed in Québec and cover building envelopes (insulation, airtightness, doors and windows) as well as mechanical and electrical systems (ventilation, air conditioning, heating, lighting, etc.).

Technical and economic studies will precisely determine the new standards that will be based on the Novoclimat voluntary norm for individual homes and multi-dweller buildings. By comparison, new standards for industrial, commercial and institutional buildings will aim for energy performance levels equal or superior to those set by the federal government's Commercial Building Incentive Program (CBIP) for New Buildings.

#### 2.1.2 Transportation and the municipal world

Within Québec, transportation is the economic sector that emits the greatest volume of GHG, and this figure is constantly on the rise. Yet our motor vehicle fleet is one of the best performers in Canada with respect to fuel consumption. Moreover, Montréal is one of the cities in North America with the highest rate of use of public transit. Numerous initiatives are currently in motion aimed at lowering GHG emissions in this sector.



Since 2003, the Government of Québec has invested an average of 385 million dollars annually to assist in funding public transit. Thanks to a multiplicity of actions on the part of government and its partners, public transit usage has increased despite the high level of competition from private automobiles. In the Montréal region, suburban train passenger use has doubled over the last 10 years. New lines connecting Blainville to Saint-Jérôme and downtown Montréal to Repentigny and Mascouche will allow these efforts to continue to move forward.

With the implementation of its Québec Public Transit Policy (announced on June 16, 2006), the government will accentuate financial assistance to public transit with the goal of increasing traffic by 8% by 2012. To achieve this, the Ministère des Transports will increase aid for public transit infrastructure expenditures.

In its 2006-2007 budget, the government announced a measure allowing employers to increase the tax deduction on the cost of public transit passes furnished to their employees from 100% to 200%. At the same time, the government proposed a partial reimbursement of the Québec Sales Tax (QST) up to a maximum of \$2,000 for purchasers of hybrid (gas/electricity) vehicles that consume 6 litres and less of gasoline per 100 kilometres, and full reimbursement of the fuel tax collected on biodiesel.

On October 11, 2007, the government announced the Québec Infrastructures Plan. This plan will see two billion dollars invested in the maintenance and improvement of infrastructures and public transit systems over the next four years. An additional 500 million dollars, supplied by the Société de financement des infrastructures locales (SOFIL), will also be used to develop public transit infrastructures.

Multimodal transport had a revival in 2005, particularly in the maritime sector. As an example, the Kruger Corporation took the first step by choosing river barge transport for moving wood chips from Forestville to Trois-Rivières. As for Aluminerie Alouette, it uses river transport to move 250,000 tons of aluminum between Sept-Îles and Trois-Rivières. These two innovative projects will save between 9,000 and 14,500 tons of GHG emissions each year. This form of transport seems to offer an interesting GHG reduction and energy efficiency potential.

Moreover, a change in licensing fees that came into force on January 1, 2005 favours reduced vehicle pollutant and GHG emissions, with additional fees levied on high displacement vehicles (engine volume in excess of four litres) that are reinvested in public transit.

An amendment to the Highway Safety Code was also made in December 2007 to authorize pilot project new vehicle or equipment (i.e. low speed electric vehicle) access to the road network.

Additionally, the Québec heavy vehicle inspection and maintenance program came into effect on June 1, 2006. This program requires truckers to ensure that their vehicles are well maintained and results in an annual reduction of 82,000 tons in GHG and harmful emissions (small particles, nitrous oxide and hydrocarbons).

Finally, municipalities play a key role in the fight against climate change since it is estimated that they are directly or indirectly responsible for nearly half of Québec's GHG emissions. Their proximity to citizens makes them frontline players in efforts to reduce GHG emissions, particularly in the fields of transportation where urban planning is an important issue, and residual materials. Action undertaken by municipalities over the coming years will determine their ability to adapt to the impact of climate change, whether in the areas of urban heat islands, coastline erosion or permafrost thaw.





Since 2002, Québec City and Montréal have led the way in the municipal world by undertaking to inventory GHG emissions on their territory and initiating concrete measures in the fight against climate change. More recently, Laval and Sherbrooke have followed suit.

Finally, in May 2007, the government unveiled its new Climatsol program for soil decontamination. This program will encourage the incorporation into land development projects of measures that have a real and quantifiable impact on the reduction of building energy consumption and GHG emissions. The program has a total budget of 50 million dollars for the 2007-2010 time frame. To be eligible, projects submitted to this program are required to include a building energy efficiency component when proposing new construction or add-ons to existing buildings. Projects must also include the maintenance or creation of green spaces.

**MEASURE 3: UTILIZE THE NECESSARY MECHANISMS TO REQUIRE MANUFACTURERS OF LIGHT-DUTY VEHICLES SOLD IN QUÉBEC TO MEET A GHG EMISSIONS STANDARD STARTING IN 2010**

Total potential reduction and avoidance: 1.7 megatons  
Investment: zero

In 2004, California set new GHG emission standards for light vehicles that require automobile manufacturers to market vehicles that meet annually determined GHG emission ceilings. Between 2009 and 2016, the California standard will lead to a 25 to 30% drop in GHG emissions for new vehicles placed into service. Twelve other American states including New York and much of New England have since followed California's lead. A number of Midwest American states have also announced similar intentions.

The Government of Québec intends to use the mechanisms at its disposal to ensure that vehicles sold on its territory comply with more demanding standards of GHG reduction and energy consumption. Québec is the first Canadian province to have announced its intention to adopt such standards and intends to harmonize them with the California standards for limiting motor vehicle GHG emissions. The implementation of this measure will be concurrent with the California steps.

**MEASURE 4: AIM TO HAVE GASOLINE DISTRIBUTORS INCLUDE A MINIMUM OF 5% ETHANOL IN THEIR TOTAL FUEL SALES BY 2012**

Total potential reduction and avoidance: 780 kilotons  
Investment: 30 million dollars

Using ethanol as a replacement fuel allows for GHG emission reduction in the transportation sector. In order to facilitate access to this fuel, the Government of Québec wants gasoline distributors to include at least a 5% ethanol content in their overall Québec fuel sales by 2012. This measure will provide a 300 million litre savings in fossil fuel consumption.

It should be stated that the Government of Québec is focussing on local cellulosic ethanol production from forest biomass, agricultural residues and residual materials, not corn. Production of this type of ethanol is technologically more demanding but it has the advantage of being more environmentally profitable for Québec.



**MEASURE 5: SUPPORT MUNICIPALITIES TAKING GHG EMISSION INVENTORIES AND ACTION ON CLIMATE CHANGE AND IN ADOPTING REGULATIONS TO OFFSET THE EFFECTS OF IDLING MOTORS**

Total potential reduction and avoidance: 460 kilotons  
Investment: 14.2 million dollars

The Government of Québec intends to offer financial support for municipal organizations (municipalities, RMCs, inter-municipal bodies, etc.) that seek to prepare inventories of their GHG emissions and plans for combating climate change. Municipal organizations that are already in possession of their inventories and Action Plans will be able to prepare a plan for adapting to the impact of climate change.

The Government of Québec will also offer financial support to municipalities that have passed or intend to pass regulations targeting needless vehicle idling. Idling consists of keeping the motor of a parked vehicle turned on. When a motor idles for only ten minutes a day, it consumes on average 100 litres of fuel per year and emits 254 kilograms of GHG annually as well as many other atmospheric pollutants that are harmful to human health. When multiplied by the total Québec automobile fleet of 4.2 million vehicles, these emissions amount to significant quantities of GHG.

Several Québec municipalities including Montréal and Québec City already regulate vehicle idling on their territory, and many other municipalities have already shown an interest in adopting this kind of regulation.

**MEASURE 6: ENCOURAGE THE DEVELOPMENT AND USE OF PUBLIC TRANSIT**

Total potential reduction and avoidance: 100 kilotons  
Investment: 720 million dollars

Québec has an important potential for GHG emission reduction in the area of urban public transport. Public transit includes urban and inter-city public transit, school busses, adapted transit and rural transit.

The government will encourage the development and utilisation of public transit by financing bus lanes and adopting preferential measures. As part of this policy, the purchase of hybrid or electric buses, additional suburban trains and improvements to subway infrastructures could also benefit from government financial support.

**MEASURE 7: ENCOURAGE THE DEVELOPMENT AND USE OF TRANSPORTATION ALTERNATIVES**

Total potential reduction and avoidance: 30 kilotons  
Investment: 60 million dollars

Many options exist outside of public transit that could reduce the daily use of single passenger vehicles. Carpooling and active transportation such as bicycling and walking are viable solutions for both individuals and companies, and these are solutions that the government wants to promote. For example, citizens that ride their bike to work also improve their physical condition. They emit no atmospheric pollutants or GHG and in addition, help reduce urban smog and noise pollution. In order to successfully promote this mode of alternative transportation, it is essential to develop networks of safe bicycle lanes that run from residential neighbourhoods to employment centres like downtown areas, industrial parks, shopping centres, educational institutions, etc.

As well, carpooling reduces the cost of moving people while decreasing urban congestion and associated GHG emissions.



The government intends to set up a program to fund infrastructure projects that favour the utilisation of these alternative modes of transportation.

**MEASURE 8: ENCOURAGE IMPLEMENTATION OF MULTI-MODAL PROJECTS FOR THE TRANSPORTATION OF MERCHANDISE**

Total potential reduction and avoidance: 80 kilotons  
Investment: 60 million dollars

The transport of goods is essential to the growth of our economy. Québec is already blessed with well-developed rail and water transport networks. As a rule, these modes of transport are less intensive emitters of GHG than trucks. In point of fact, cabotage and rail transport respectively emit 10 and 18 grams of GHG per ton/kilometre while trucks produce 96 grams. Within this context, the government intends to financially support inter-modal projects so as to help develop a better balance between various modes of transport in Québec's existing system and lead to significant reductions in GHG emissions.

**MEASURE 9: IMPLEMENT A SUPPORT PROGRAM FOR THE MARKETING OF TECHNOLOGICAL INNOVATIONS IN ENERGY EFFICIENCY IN THE TRANSPORT OF MERCHANDISE**

Total potential reduction and avoidance: 1.05 megatons  
Investment: 45 million dollars

Between 1990 and 2005, GHG emissions from heavy vehicles increased by 84% due to growth in demand for this type of transport. In order to reduce GHG emissions in this sector it will be necessary to take full advantage of technological innovations that make transport more efficient and by the same token improve its economic competitiveness.

Through this action, the government will financially support the introduction of new energy-efficient and GHG-reducing technologies by trucking firms. The financial assistance program will facilitate the acquisition of equipment that improves vehicle aerodynamics and fleet energy efficiency, such as back-up electrical systems (on-board generators), back-up heating and air conditioning systems, management systems and on-board computers.

As for marine and rail transport, the government will foster investment in technological and technical improvements to raise ship and locomotive energy efficiency.

The program will also make it possible to finance research or pilot projects that show potential in regard to reducing GHG emissions in the transport of merchandise.



**MEASURE 10: ADOPT A REGULATION REQUIRING MANDATORY USE OF SPEED LIMITING DEVICES ON ALL TRUCKS AND SETTING THE MAXIMUM SPEED FOR THESE VEHICLES AT 105 KM/HR**

Total potential reduction and avoidance: 330 kilotons  
Investment: zero

A speed limiter is an integrated circuit that allows for regulating maximum vehicle speed. Most trucks built during the last decade are equipped with this technology. The regulation is to target all heavy vehicles registered in Québec.

Thanks to this action, it will be possible to realize fuel savings on the order of 10,500 litres per truck (tractor and semi-trailer), which will translate into additional annual savings of \$8,000 in per-vehicle fuel consumption calculated on the basis of average annual usage of 200,000 km.

**2.1.3 Québec's industrial sector**

Overall, Québec's industrial sector reduced its GHG emissions by 8.5% between 1990 and 2005. However, it still remains responsible for nearly 31% of our GHG emissions, the main emitting industries being aluminium, pulp and paper, petroleum refining, metallurgy, cement, lime and chemical products. It is thus essential to induce these enterprises to pursue their efforts in the area of GHG emission reductions.

In the 2000-2003 Action Plan, the Government of Québec adopted a voluntary approach for certain industrial emitters. In 2002, for example, it signed a framework agreement with the Aluminum Association of Canada as well as private agreements with Alcoa, Alcan and Aluminerie Alouette. These agreements alone have led to GHG emission reductions of some 550,000 tons of equivalent CO<sub>2</sub> per year.

Moreover, in order to consolidate its knowledge of industrial sector emissions, the government adopted a regulation in November 2007 requiring principal emitters to declare their emissions of GHG and other air contaminants on an annual basis.

**MEASURE 11: REDUCE GHG EMISSIONS IN QUÉBEC'S INDUSTRIAL SECTOR**

Total potential reduction and avoidance: 940 kilotons  
Investment: 1.2 million dollars

In the Action Plan unveiled in 2006, the government intended to continue pursuing voluntary agreements with all industrial sectors in the light of the success this approach had achieved since 2002. However, the decision was revised following the publication of the April 2007 federal Regulatory Framework for Air Emissions which does not meet Québec's needs, and the emergence of North American regional GHG emission cap and trade systems.

In this context, the Government of Québec chose a regulatory GHG emission cap and trade approach to attaining Québec's industrial sector reduction goal while allowing targeted enterprises to comply at the lowest cost. This is the perspective in which Québec joined the Western Climate Initiative (WCI) in April 2008. This grouping of U.S. states and Canadian provinces has as its main goal the development and implementation of a GHG emission cap and trade system.

To that end, Québec and Ontario signed the Provincial and Territorial Greenhouse Gas Cap and Trade Initiative that seeks to develop and implement a GHG cap and trade system as early as 2010. This system will be prepared in conjunction with other regional systems in development, including the WCI.

The alliances with the WCI and Ontario will ensure Québec enterprises' active participation in a carbon market that will be compatible with other GHG emission cap and trade systems.



**MEASURE 12: IMPLEMENT THE REGULATION RESPECTING HALOCARBONS**

Total potential reduction and avoidance: 700 kilotons  
Investment: zero

The Regulation respecting halocarbons, adopted in 2004, aims at reducing the emission of halocarbons into the air by banning CFCs and halons. This regulation requires the recovery or draining of any apparatus that contains halocarbons prior to starting work that may produce emissions. Workers who use halocarbons are also required to obtain all necessary environmental qualification.

**2.1.4 Residual materials**

Each year, Québec must eliminate 6.4 Mt of residual materials, mostly through landfilling. The biogas generated by anaerobic (oxygen-absent) decomposition of organic matter disposed of in landfill sites is an important source of GHG. Methane is also a problem as it is considered 21 times more harmful than carbon dioxide in terms of its contribution to the greenhouse effect. In 2005, 6.5 Mt of equivalent CO<sub>2</sub> were generated by landfill sites in Québec.

**MEASURE 13: IMPLEMENT THE REGULATION RESPECTING THE LANDFILLING AND INCINERATION OF RESIDUAL MATERIALS (REIMR)**

Total potential reduction and avoidance 500 kilotons  
Investment: zero

In 2006, an important regulation which notably aims at minimizing the impact of biogas generated by landfill sites came into effect. The Regulation (REIMR) contains many provisions that seek to control biogas emissions and ensure constant follow-up of the efficiency of installed measuring equipment. Henceforth, all technical landfill sites (LET) will be required to ensure management of generated biogas. The most important technical landfill sites that process more than 50,000 tons of residual materials each year will be required to capture and store biogas, ideally for purposes of valorization or eventually for incineration.

**MEASURE 14: FINANCIALLY SUPPORT THE CAPTURE AND INCINERATION OR VALORIZATION OF BIOGAS GENERATED BY LANDFILL SITES NOT SO REQUIRED WITHIN THE FRAMEWORK OF THE REIMR**

Total potential reduction and avoidance 3.7 kilotons  
Investment: 38 million dollars

There is a multitude of small or recently closed sites or sites that will close in the coming years that are not subject to the new Québec regulation. These sites offer an interesting GHG reduction potential and the government intends to financially support the installation of equipment to capture and incinerate or valorize the biogas from these sites from an energy perspective. Additionally, in its Energy Strategy, the government announced its intention to deregulate biogas distribution in order to facilitate the process of valorization.



### 2.1.5 Agriculture and biomass valorization

Agricultural GHG emissions come essentially from biological processes (interactions between soil-based microbes and nitrogen, ruminant digestion and farm fertilizer storage) and the utilisation of fuel and other combustibles. In 2005, the agricultural sector emitted 7.7 Mt of equivalent CO<sub>2</sub>, which amounted to 8% of total Québec GHG emissions. Between 1990 and 2005, emission levels remained relatively stable, increasing by only 2.7%, while agricultural GDP rose by nearly 30%.

#### MEASURE 15: SET UP SUPPORT PROGRAMS FOR MANURE PROCESSING AND FOR THE ENERGY VALORIZATION OF AGRICULTURAL, FOREST AND MUNICIPAL BIOMASS.

Total potential reduction and avoidance: 1.8 megatons  
Investment: 124 million dollars

Nearly 20% of this sector's emissions are related to manure management. Many technologies exist for managing these substances that provide for their energy valorization and for appreciable gains in GHG reduction. Additionally, other sources of agricultural biomass may serve as energy sources and substitutes for fossil fuels, thus diminishing anthropic CO<sub>2</sub> emissions. The government will thus begin a program of financial support for actions aimed at reducing GHG emissions in this sector.

Moreover, the government wishes to support the reduction of GHG emissions by forest, agricultural and municipal biomass energy valorization (including commercial, institutional and industrial organic waste). No food biomass energy valorization project will be eligible within the framework of this measure.

### 2.1.6 Government leadership

The Government of Québec intends to lead by example in the fight against climate change by reducing its own GHG emissions, in particular those from public buildings and its light motor vehicle fleet.

Total GHG emissions for Québec public buildings have been reduced by more than 15% on average since 1990, thanks to the implementation of energy efficiency measures. One of the objectives of the 2006-2009 Société immobilière du Québec Strategic Plan is to foster adhering to the GoGreen program. In 2007, 63 SIQ buildings were program-certified for having incorporated ecologically responsible practices into management procedures.

Moreover, in the area of transportation, many ministries have acquired hybrid light vehicles, and the parking subsidy for government employees will be abolished in 2009.

In spite of this positive performance, significant opportunities remain for further GHG emission reductions in public buildings and vehicle fleets.

#### MEASURE 16: BY 2010, IMPROVE ENERGY EFFICIENCY OF PUBLIC BUILDINGS TO 10% TO 14% BELOW THE 2003 LEVEL AND REDUCE FUEL CONSUMPTION OF GOVERNMENT DEPARTMENTS AND PUBLIC ORGANIZATIONS BY 20%

Total potential reduction and avoidance: 150 kilotons  
Investment: zero

The government intends to extend its good performance in public building energy efficiency by calling on school boards and the Société immobilière du Québec to improve energy efficiency in their buildings by 10% compared to 2003. The target is 14% for institutions of higher learning and health and social services, while for other ministries and organizations it has been set at 12%.



Additionally, all new buildings added to the public network as well as enlargements and major renovations will be subject to new energy performance standards. Improvements of at least 25% in energy efficiency will be required compared to the standards set for new buildings in the *Model National Energy Code of Canada for Buildings* until the new Québec Building Code comes into effect.

The Government of Québec also wishes to lead by example in the field of transportation. It intends to reduce fuel consumption in its ministries and organizations by 20% between now and 2010, compared to 2003 figures. To this end, the government will perform annual follow-ups on vehicle use and adopt rules for improving overall business travel, make drivers aware of energy-saving driving techniques and establish vehicle purchase criteria that are more favourable to the environment. Finally, the Government of Québec will improve maintenance of these vehicles and upgrade training programs designed for maintenance personnel and vehicle users.

These measures will be taken in co-operation with l'Agence de l'efficacité énergétique. An accounting mechanism for ministries and government organizations will be incorporated into management reports.

**MEASURE 17: REQUIRE EACH GOVERNMENT DEPARTMENT TO DEVELOP A PROGRAM TO REDUCE GHG EMISSIONS GENERATED BY EMPLOYEES COMMUTING TO WORK**

Total potential reduction and avoidance: 20 kilotons  
Investment: 9 million dollars

This type of program consists of studying daily employee commuting patterns and offering alternate solutions to single-passenger automobile travel, thus reducing GHG emissions. Other measures may be proposed such as funding monthly public transit passes, reserved parking for carpoolers, creation of a carpool Internet site, shuttles for the exclusive use of cyclists, improved bicycle access to the workplace through secure parking areas, lockers and showers, etc.

**2.1.7 Public awareness**

Consumers exercise their responsibilities with respect to climate warming through choices they make every day. We must make people aware of the necessity of acting to counter climate change and remaining conscious of the various means available to reach this goal. To that end, many initiatives have taken place in Québec in recent years, aimed at sensitizing the population to the impact of climate change.

For example, the Société de l'assurance automobile du Québec (SAAQ) has added new eco-energy tips to its new *Driving a Passenger Vehicle* handbook. The SAAQ will also soon add an "energy efficiency" component to its mandatory driver's licence examinations. Thanks to this initiative, new drivers will be fully aware of the automobile's impact on the environment and will know how to minimize its impact, which will in turn make it possible for them to realize savings on fuel.



**MEASURE 18: SUPPORT A VARIETY OF PUBLIC AWARENESS AND PARTNERSHIP INITIATIVES**

Total potential reduction and avoidance: 100 kilotons  
Investment: 31.5 million dollars

The government intends to participate financially in structure-friendly projects and various awareness initiatives related to the fight against climate change as well as partnerships aimed at developing a carbon market.

**MEASURE 19: IMPLEMENT A TRAINING PROGRAM FOR QUÉBEC ENTERPRISES AND ORGANIZATIONS ON VARIOUS SYSTEMS OF CO<sub>2</sub> CREDITS**

Total potential reduction and avoidance: zero  
Investment: 3 million dollars

Since the implementation of the Kyoto Protocol, an international market in GHG emission reductions has emerged with 2006 transactions evaluated at 30 billion dollars. The most active market segment, located in Europe, has existed since January 2005. Within North America, voluntary emission reductions are already being traded on the Chicago Climate Exchange (CCX) carbon exchange. Transactions should also be coming to Canada, since in July 2006, the Montreal Stock Exchange and CCX became partners in the creation of the Montreal Climate Exchange (MceX) that is the first Canadian market for financial products related to the environment. In fact, in May 2008 the Montreal Stock Exchange introduced MceX carbon emission futures trading.

Moreover, many initiatives aimed at the creation of a GHG emission cap and trade system are presently in development across North America. Among these are the Western Climate Initiative of which Québec is a member, the federal Regulatory Framework for Air Emissions and the Regional Greenhouse Gas Initiative (RGGI) where Québec enjoys observer status.

The development of these systems generates business opportunities for many enterprises and institutions in Québec, particularly in the sectors that are directly linked to the environment and to energy, but also in all fields where it is possible to reduce GHG emissions. Québec has every interest in preparing its enterprises to take advantage of this market potential and encouraging GHG emission reduction projects.

Three-component training seminars on how national and international mechanisms for the creation of credits work will be offered to Québec enterprises and organizations. Part one will initiate trainees to the opportunities offered by a carbon market while part two offers a detailed explanation of the way a GHG reduction project works. Part three will explore the needs and reduction potentials of emitting enterprises. Market studies and trade missions may also be undertaken and protocols developed for quantifying emission reductions.





### 2.1.8 Research, development and technology deployment

In the context of fight against climate change, it is only natural that medium and long-term GHG reductions will take place thanks in large proportion to new technology. The government intends to encourage the development of technologies such as those related to renewable energy, biofuel, energy efficiency, biomass valorization and CO<sub>2</sub> capture and storage. In Québec, research and development (R&D) in technologies related to climate change has increased markedly in the last few years. A recent survey has revealed more than one hundred emerging technologies that have an impact on GHG reduction.

Attractive markets will open to enterprises working on the development of technologies used in the fight against climate change. On a global scale, there is a growing demand for clean energy and energy efficiency, driven by efforts towards GHG emission reduction and the will of nations to reduce their dependency on petroleum.

Since 2002, numerous Québec technological innovations have appeared in the fields of energy efficiency, biomass energy valorization (liquid manure, waste, forest residue) and renewable energy, thanks in particular to Québec's technology showcase support program or "Programme de soutien aux vitrines technologiques." Such technologies, that can reduce GHG emissions in these sectors, have considerable export potential in a context in which the carbon market is rapidly developing on both side of the Atlantic.

In the transportation field, many other interesting technologies have been developed in recent years, such as the TM4 (a subsidiary of Hydro-Québec) electric propulsion system, the miniaturization of semi-trailer cabin heating systems and the confection of new metals for the automotive industry that are lighter but stronger. Additionally, Québec now has a hydrogen research institute at Université du Québec à Trois-Rivières. This institute conducts leading-edge research in the promising field of hydrogen production, storage and energy uses.

Finally, in May 2008 the government revealed its new Development strategy for Québec's environmental and green technology industry – For a Green and Prosperous Québec (that has been given an annual budget of 282 million dollars). The development and deployment of these new technologies represents a unique growth potential for a green technology industry that combines the fight against climate change with business opportunities. The government has invested 25 million dollars as partner in a 100 million dollar venture capital fund that will allow manufacturers to realize clean renewable energy production projects aimed at reducing GHG.

#### MEASURE 20: IMPLEMENT A PROGRAM TO SUPPORT TECHNOLOGICAL RESEARCH AND INNOVATION FOR THE REDUCTION AND SEQUESTRATION OF GHGS

Total potential reduction and avoidance:	1.1 megatons
Investment:	135 million dollars

The government has identified the most promising R&D niches for Québec, taking into account existing organizations, current university research expertise and manufacturing potential. Among these niches are forest, agricultural and municipal biomass valorization, capture and storage of GHG emissions, geothermy, solar energy and hydrogen.



The Government of Québec intends to set up financial assistance programs for research projects in these sectors. Government support will especially target the final phase of development and pre-commercial demonstration of technologies that fight climate change and improve the productivity, profitability and global competitiveness of Québec industry.

The demonstration, pre-commercial and marketing stages of these new technologies will be supported in order to recover investment in research through sales and exports of Québec products and services associated with GHG reduction. For these last stages, financial assistance will be granted to help the enterprises pull their projects together, finance the demonstration of innovative technologies and adapt existing technologies to Québec realities.

Moreover, there exists within Québec a significant potential for geological and mineral CO<sub>2</sub> capture, for example in sedimentary basin saline aquifers or industrial waste such as that generated by asbestos mining (chrysolite). The government will thus support research and development in this promising field.

### 2.1.9 Recourse to climate change economic instruments

The laws of the marketplace and traditional regulations do not always lead to hoped-for environmental results. Economic instruments are among the tools that governments can use to reduce GHG emissions. Institutions such as the Organisation for economic co-operation and development (OECD) and Canada's National Round Table on the Environment and the Economy (NRTEE) strongly recommend that such tools be used to change individual and corporate behaviour.

Hydrocarbons, used especially in the transportation and building sectors, are responsible for more than 70% of Québec GHG emissions. In order to substantially reduce GHGs, these energy sources have to be targeted using all available tools whether regulatory, economic or voluntary.

After the Sustainable Development Act became law in April 2006, the Ministère du Développement durable, de l'Environnement and des Parcs created a Green Fund, in June of the same year. This fund can be added to from amounts collected through the application of economic instruments.

## CATEGORIES OF ECONOMIC INSTRUMENTS

Economic instruments can be divided into two main categories, fiscal and non fiscal. The first category includes eco-taxes, user fees, fiscal incentives and financial compliance incentives. The second category includes cap and trade systems and deposits.



The funding of climate change measures will be ensured by an annual duty on gasoline and fossil fuels called the annual Green Fund duty, collected from distributors of target fuels and other combustibles. In addition to eliciting the desired consciousness-raising among the population and inducing users to modify their habits, collecting this fee will also achieve desirable environmental goals.

Revenues generated by the fee will be on the order of 1.2 billion dollars over six years or about 200 million dollars per year, to which will be added a 350 million dollar contribution from the federal government Trust fund for clean air and climate change. Québec will thus be the beneficiary of 1.55 billion dollars by 2012. These sums will be paid into the Green Fund and used to finance the 26 measures of the Action Plan including those related to energy, transport, municipalities, the industrial sector, residual materials, agriculture, public awareness, technological innovation, health and the environment.

The follow table summarizes these 2006-2012 Action Plan measures for reducing and avoiding GHG emissions. Additional information may be found in the appendix.

## GHG EMISSION REDUCTIONS AND AVOIDANCE TO BE ACHIEVED BY 2012

GHG emission reduction and avoidance actions	Potential for GHG emission reduction and avoidance
Energy and transportation (actions include technological innovation, energy efficiency in buildings, municipalities, alternative fuels, public transit and transport of goods)	5,6 Mt of equivalent CO <sub>2</sub>
Industrial sector (voluntary and regulatory measures including the <i>Regulation respecting halocarbons</i> )	1,6 Mt of equivalent CO <sub>2</sub>
Residual materials (implementation of the <i>Regulation respecting the landfilling and incineration of residual materials</i> , biogas capture and valorization)	4,2 Mt of equivalent CO <sub>2</sub>
Agriculture and valorization of agricultural, forest and municipal biomass	1,8 Mt of equivalent CO <sub>2</sub>
Government leadership	0,2 Mt of equivalent CO <sub>2</sub>
Public awareness	0,1 Mt of equivalent CO <sub>2</sub>
Technological development	1,1 Mt of equivalent CO <sub>2</sub>
<b>TOTAL</b>	<b>14.6 Mt of equivalent CO<sub>2</sub></b>



Source : Ministère des Ressources naturelles et de la Faune



Source : Denis Bruneau © Le Québec en images, CCDMD



Source : Blogaz © Le Québec en images CCDMD, Denis Chabot

## 2.2 THE ACTION PLAN'S IMPACT ON QUÉBEC GHG EMISSIONS

The measures described in this plan will make it possible for the Government of Québec to reduce annual Québec GHG emissions by 14.6 megatons of equivalent CO<sub>2</sub> below anticipated 2012 levels, according to a Business As Usual (BAU) forecast. Emission levels for 2012 will thus be reduced from 96.9 to 82.3 megatons of equivalent CO<sub>2</sub>.

### ACTION PLAN IMPACT OF GHG EMISSIONS (2005 DATA)

GHG emissions	Equivalent Mt. CO <sub>2</sub>
1990 level	87,5
2005 level	92,0
BAU 2012 emission forecast	96,9
<b>Efforts made as part of the Québec Action Plan</b>	<b>14,6</b>
Impact of the Action Plan and forecast 2012 emissions (drop of 6% below 1990 emission levels)	82,3

## 2.3 ACTIONS TARGETING QUÉBEC'S ADAPTATION TO CLIMATE CHANGE

Even if much uncertainty remains with respect to the magnitude and timing of the various impacts of climate change in Québec, the reports of the Intergovernmental Panel on Climate Change (IPCC) clearly indicate that such impact is both inevitable and will bring significant consequences for the entire international community, including Québec. Precaution counsels us to start to prepare right away.

Québec's 1.7 million sq. km. area is replete with a multitude of ecosystems that are adapted to regional and local climates. The characteristics, magnitude and speed of climate change may vary according to location. Additionally, the land and water ecosystems and populations of these areas and their socio-economic activities will be affected by such change, both positively and negatively. The sensitivity of the Québec economy to climate change will be a function of the nature and size of sectors that may benefit from climate evolution, or contrariwise, suffer from its impact. Agriculture and natural resource extraction and transformation may be directly affected by climate change. Other sectors of the economy such as transport and manufacturing will be subject to effects whose nature and size will need to be evaluated in order to adapt to them. Monitoring the evolution of the climate and its effects on natural and man-made environments has become a necessity.

For more than a decade now, Québec has undertaken actions aimed at sensitizing its population to the phenomenon of climate change. The effects of global warming have already been felt. Now it is time to intensify our efforts aimed at adapting to them.

### 2.3.1 Health and public security

Climate change may result in non-negligible consequences for human health. Increased rates of infectious disease, frequency of heat waves and extreme weather events will likely impact the death rate of our population, especially for the vulnerable (seniors, the homeless, infants, etc.).

However, the effects of climate change on human health may be mitigated by adopting preventive measures, improving our knowledge base and setting up alert and monitoring systems.





The Government of Québec has taken many steps in recent years towards preparing the population for the impact of climate change. For instance, it required many regions of Québec to prepare individualized emergency strategies for dealing with heat waves. These regional emergency plans call for assistance to those who are at risk, preparing cool zones, distributing water to the homeless and applying appropriate measures for hospitalized or home care patients.

In the area of public security, the climate warming phenomena that are of most concern are increased frequency and intensity of heavy rainfall and violent wind, drought, rise in average sea level and freeze-thaw cycles. These phenomena may in turn cause other kinds of disasters that can affect human activity, such as power outages or telecommunication breakdowns, dam breaches or the collapse of structures and buildings.

Many phenomena are likely to increase in magnitude, and so in evaluating the risks of disasters stemming from climate change we need to look at the growing vulnerability of our communities. Like other societies, Québec's population and its economy are more and more exposed to the effects of climate disturbance. This situation is caused by numerous factors: housing developments in areas that are fragile or have significant exposure to bad weather, changes to natural environments caused by human activities, urban sprawl and the densification of cities, aging public and private infrastructures, etc.

This is the context in which the government launched its Cadre de prévention des risques naturels in November 2006, in which at term nearly 55 million dollars will have been invested. This framework supports municipalities that want to act preventively with respect to principal natural risks so as to attenuate their impact, including some risks related to climate change (increased coastal erosion, flooding, landslides, etc.). The value of infrastructures that will be threatened by erosion over the next three decades is estimated to be in excess of one billion dollars. A study of costs related to various adaptive measures is currently being made.

This framework thus complements the Action Plan measures aimed at adapting to global warming.

#### MEASURE 21: SET UP MECHANISMS TO PREVENT AND MITIGATE THE IMPACT OF CLIMATE CHANGE ON HEALTH AND PUBLIC SECURITY

Total potential reduction and avoidance	zero
Investment:	34 million dollars

In order to mitigate the negative impacts of climate change on the health of Québécois, the Government of Québec will set up two monitoring systems. Firstly, it will install a warning system for intense heat and a monitoring system for health problems related to climate change throughout regions susceptible to these issues. Following this, the government will introduce a short and long term epidemiological monitoring system for physical and psychosocial health problems related to extreme climate events.

Additionally, systems for monitoring infectious diseases will be improved to ensure rapid pathogen and disease detection in a climate change context. Training sessions will be offered to public health, clinical service and civil protection personnel concerning these diseases and emerging health problems. Committees of experts will also be struck to advise health institution managers on applicable actions required to ensure that buildings and infrastructures are better able to resist the harmful effects of extreme heat.

Moreover, the government will offer financial support for the creation of urban cool zones (planting trees, park creation, municipal swimming pools, etc.) and for air conditioning of strategic infrastructure (hospitals, care centres for the elderly, schools, etc.) so as to mitigate the impact of summer heat waves.



As for public security, the government intends to support the development of the means for adapting coastal communities to climate change with respect to coastline erosion. It also supports the creation of a research chair in coastal geosciences that will be completely devoted to the acquisition of knowledge about the dynamics of coastline erosion, impact evaluation and recent, current and future challenges associated with coastal dynamics and the strengthening of coastal community adaptation capabilities in the context of integrated coastal management.

Finally, it intends to commission studies on the various types of flooding that occur in Québec and use the results to support mapping-out restricted development zones and preparing regulations and eventually, civil security plans. Among other results of these studies will be the ability to propose means for adapting to the consequences of climate change as it concerns development in areas subject to varying risks of flooding.

### 2.3.2 The environment, natural resources and the territory

The characteristics, scope and speed of climate change may vary in different parts of Québec. Monitoring networks and programs are thus vital elements in the fight against climate change and its effects on various Québec socio-economic sectors.

With respect to monitoring networks, the government is currently upgrading its air quality station network that was developed as part of the Canada-Québec agreement on the atmospheric pollution-monitoring program. This will improve monitoring of air pollution that is harmful to human health, such as smog. Inasmuch as the chemical composition and formation mechanisms of air pollution are affected by the climate, especially during smog episodes, it is important to better understand the repercussions of climate change on air quality in order to get an improved grip on tendencies in this field.

North of the 55<sup>th</sup> parallel, in Nunavik, the government has installed or re-started automated systems that measure the thermal permafrost system at various depths beneath state-owned transportation infrastructures. Follow-up is taking place at seven northern airports deemed to be at risk from accelerated permafrost thawing. The systems gather data on temperature and follow permafrost evolution and the impact of thawing to better plan adaptive action. Permafrost characterization work (geophysical reports and shallow-depth drilling) by Université Laval scientists is also taking place at some airport sites.

Coastline erosion threatens shore properties as well as public infrastructures located in vulnerable areas and this phenomenon is growing due to climate change. For example, the period when the Gulf of St. Lawrence is iced over will shorten from 65 days to around 25 days annually, resulting in ice-free shorelines suffering increased exposure to erosion. Similarly, vulnerable sites and protective structures along the national road network in the Gaspé, Côte-Nord and Îles-de-la-Madeleine regions will require more emergency intervention due to more and more frequent extreme climate events.



**MEASURE 22: CONSOLIDATE CLIMATE, HYDRIC, SUBTERRANEAN WATER RESOURCE AND AIR QUALITY MONITORING NETWORKS**

Total potential reduction and avoidance: zero  
Investment: 24 million dollars

Consolidating and adapting environmental monitoring networks is indispensable for adequately quantifying current trends and understanding the magnitude of ongoing changes, evaluating potential impact and preparing adaptive action. In fact, in order to support the preparation of such action, it will be necessary to have available reliable climatologic data, interpretative tools and indicators adapted to the problem of climate change. Additionally, suspected hydrology system fluctuations may have negative effects on the quantity and the quality of the water supply or on its utilisation. In the same context, increased sampling of the replenishment capacity of underground reservoirs that could very well suffer considerable transformation may be required since this is a phenomenon that needs to be closely monitored.

For such reasons, the government intends to invest in consolidating and modernizing its climatologic and hydrometric networks and prioritizing that part of the network located north of the 50<sup>th</sup> parallel. It will also pursue development of a water table monitoring network and improve urban climate monitoring.

Additionally, the government intends to see to the needs for the analysis, interpretation and dissemination of climatologic data and interpretative tools and indicators adapted to climate change and the understanding of its repercussions on air quality.

Moreover, the close relationship between air pollution (smog, for example) and the health of the Québec population highlights the necessity of being able to count on a robust air quality monitoring network adapted to climate warming.

The government aims to upgrade the air quality-monitoring network and improve the programs and uses it supports (public air quality index and prediction broadcasting, strategies with respect to various sectorial sources of diffuse pollution, etc.).

**MEASURE 23: PERFORM VARIOUS EVALUATIONS AND RESEARCH RELATED TO PERMAFROST THAWING, PROBLEMS OF COASTLINE EROSION AND ADAPTING TO THE IMPACTS OF THESE CLIMATE CHANGES**

Total potential reduction and avoidance: zero  
Investment: 6.6 million dollars

The impact of climate change on sensitive environments such as permafrost will in turn affect transportation infrastructures in these areas. Two research projects will study four different methods for mitigating the effects of permafrost thaw on Nunavik transportation infrastructures. Sites under study will be the paved access road between the village of Salluit and its airport as well as the Tasiujaq gravel landing strip.

The intended budget will allow for research and follow-up on the impact of permafrost thawing on airport (access road and landing strip) and maritime transportation infrastructures in Nunavik as well as on coastal erosion issues in the Gulf of St. Lawrence and its marine estuary. In 2008-2009, deep drilling will take place at vulnerable airport sites in order to obtain further information concerning rock depth and soils and their ice content. This knowledge, combined with climatologic projections, will allow for a more accurate prediction of the scope of impact on infrastructures.

Some research studies on the problem of coastal erosion in the Gulf of St. Lawrence and its marine estuary will serve to update the identification and analysis of vulnerable sites and structures along the road network, while others will aim at analyzing structure and shore protection methodologies with a view to adapting them to climate change.





**MEASURE 24: DETERMINE THE VULNERABILITY OF QUÉBEC FORESTS AND THE FOREST SECTOR TO CLIMATE CHANGE AND INCORPORATE THE ANTICIPATED EFFECTS OF THESE CHANGES INTO FOREST MANAGEMENT**

Total potential reduction and avoidance: zero  
Investment: 6 million dollars

Climate and forests are indivisible from each other. To a great extent, climate determines the composition and distribution of forests in a highly dynamic relationship. Decisions taken today will continue to influence our forests for a very long time. Current young forests and those that will emerge from today's management activity may be subject to different climate conditions than those faced today. It is thus vital that forest stakeholders immediately incorporate climate considerations into their planning and management activities.

A forest and forest sector vulnerability study will first be made. Subsequently, climatologic scenarios resulting from simulations performed by the Ouranos consortium will be incorporated into forest sector management planning in the light of any identified vulnerabilities.

**MEASURE 25: REINFORCE WATER AND AIR QUALITY MANAGEMENT PROCEDURES**

Total potential reduction and avoidance: zero  
Investment: 12.4 million dollars

Air quality in Québec has considerably improved since the 1970s and yet the most recent evaluations of the effects of air pollution indicate that concentrations remain a public health concern in many regions of Québec. Global warming risks exacerbating this situation. The numerous episodes of smog that affect our principal cities in both summer and winter testify to the need for even more vigilance in the area of air quality and for strengthening our interventions.

To reverse the current trend, the MDDEP proposes to elicit the development of regional and/or municipal air quality plans and enhancements to regulatory monitoring.

Insofar as water management goes, using a watershed approach to planning is a highly appropriate way of preparing to adapt to the effects of climate change. In this context, the government intends to implement a hydrology modeling platform for watersheds in inhabited areas of Québec.

Through the use of representative cases, project analysis will take into account the effects of climate change on water management and the planning of adaptive measures. This hydrology model will provide stakeholders with structural tools for analysis, planning and management. It will especially provide for testing the many scenarios for adapting to the impact of climate change with respect to water management issues.



#### MEASURE 26: SUPPORT THE OURANOS CONSORTIUM PROGRAM

Total potential reduction and avoidance: zero  
Investment: 10 million dollars

The Ouranos research consortium has been working since 2001 in the field of regional climatology and adaptation to climate change. Using multidisciplinary teams, it has developed knowledge and tools regarding climate change, its impact, vulnerabilities and business opportunities in a number of areas. Research conducted in the framework of its scientific programs provides support for the implementation of a certain number of adaptive measures, as previously described. To underscore the importance of Ouranos to Québec's process of adapting to climate change, special assistance has been granted to widen the scope of its scientific programs in certain fields.

FOLLOWING THE UNVEILING OF THE ACTION PLAN ITSELF, THE GOVERNMENT WILL PUBLISH AN ANNUAL PROGRESS REPORT ON THE STATE OF ONGOING WORK. TO THAT END IT WILL IMPLEMENT AN APPROPRIATE ACCOUNTING MECHANISM AND THUS PLAN ITS ACTIONS SO AS TO ATTAIN ITS GOALS, AND AS NECESSARY, REFOCUS ITS PRIORITIES.

### 3. THE ACTION PLAN'S ACCOUNTABILITY MECHANISM



QUÉBEC IS AMONG THE MOST PROGRESSIVE NATIONS IN THE WORLD IN THE FIGHT AGAINST CLIMATE CHANGE AND ITS ENERGY PROFILE IS UNIQUE WITHIN NORTH AMERICA. REDUCING AND AVOIDING GHG EMISSION AND ADAPTING TO CLIMATE CHANGE REQUIRE THE DEVELOPMENT AND USE OF NEW TECHNOLOGY AND IMPROVED ENERGY EFFICIENCY IN MANY ACTIVITY SECTORS.

TO THIS END, THE 2006-2012 CLIMATE CHANGE ACTION PLAN HAS TWO IMPORTANT OBJECTIVES: REDUCING GHG EMISSIONS AND ADAPTING TO CLIMATE CHANGE. QUÉBEC'S GHG EMISSION PROFILE SHOWS THAT THE SECTORS THAT CONTRIBUTE THE MOST TO INCREASED GHG EMISSION ARE ENERGY AND TRANSPORTATION. CONSEQUENTLY, THE MEASURES FOR LOWERING EMISSIONS ARE MAINLY AIMED AT THESE TWO ECONOMIC SECTORS THAT HAVE SHOWN INCREASED EMISSIONS SINCE 1990. THESE MEASURES ALSO AIM TO REDUCE GHG EMISSIONS STEMMING FROM GOVERNMENT ACTIVITIES, RESIDUAL MATERIALS PROCESSING, MUNICIPALITIES, INDUSTRY AND AGRICULTURE. VARIOUS MEASURES WILL BE TAKEN TO SENSITIZE AND MOBILIZE THE PUBLIC AND TO SUPPORT TECHNOLOGICAL INNOVATION. OTHER MEASURES WILL REVOLVE AROUND THE PROCESS OF ADAPTING TO CLIMATE CHANGE WHILE MAINTAINING HEALTH AND THE ENVIRONMENT AS PRIORITIES.

ONCE AGAIN, THE GOVERNMENT OF QUÉBEC HAS DEMONSTRATED LEADERSHIP IN THE AREA OF THE FIGHT AGAINST CLIMATE CHANGE, AND INVITES ALL MEMBERS OF QUÉBEC SOCIETY TO RESPOND TO THE CHALLENGES ASSOCIATED WITH GLOBAL WARMING IN THE PERSPECTIVE OF SUSTAINABLE DEVELOPMENT.

## 4. CONCLUSION



## APPENDICES



# APPENDIX 1

## POTENTIAL GHG AVOIDANCE AND REDUCTION

Reduction or avoidance actions <sup>(1)</sup>	Reduction / avoidance potential total for 2012 <sup>(2)</sup> (Equivalent CO <sub>2</sub> ) (kt \$)	Total cost of actions for the 2006-2012 period (M \$)	Responsible ministries / organizations
1. Implement a financing program aimed at energy efficiency for individuals, industries, institutions, companies and municipalities in Québec	990	185,0	AEE
2. Amend Québec's Building Code to improve energy performance of new buildings and homes built in Québec	50	-	AEE
3. Utilize the necessary mechanisms to require manufacturers of light-duty vehicles sold in Québec to meet a GHG emissions standard starting in 2010	1 700	-	MDDEP
4. Aim to have gasoline distributors include a minimum of 5% ethanol in their total fuel sales by 2012	780	30,0	MRNF
5. Support municipalities taking GHG emission inventories and action on climate change and in adopting regulations to offset the effects of idling motors	460	14,2	MDDEP
6. Encourage the development and use of public transit	100	720,0	MTQ
7. Encourage the development and use of transportation alternatives	30	60,0	MTQ
8. Encourage implementation of multi-modal projects for the transportation of merchandise	80	60,0	MTQ
9. Implement a support program for the marketing of technological innovations in energy efficiency in the transport of merchandise	1 050	45,0	MTQ / AEE
10. Adopt a regulation requiring mandatory use of speed limiting devices on all trucks and setting the maximum speed for these vehicles at 105 Km/hr	330	-	MTQ
11. Reduce GHG emissions in Québec's industrial sector	940	1,2	MDDEP
12. Implement the Regulation respecting halocarbons	700	-	MDDEP
13. Implement the Regulation respecting the landfilling and incineration of residual materials (REIMR)	500	-	MDDEP
14. Financially support the capture and incineration or valorization of biogas generated by landfill sites not so required within the framework of the REIMR	3 700	38,0	MDDEP
15. Set up support programs for manure processing and for the energy valorization of agricultural, forest and municipal biomass	1 800	124,0	AEE, MAPAQ, MDDEP, MDEIE, MRNF
16. By 2010, improve the energy efficiency of public buildings by 10% to 14% below the 2003 level and reduce fuel consumption of government departments and public organizations by 20%	150	-	AEE
17. Require each government department to develop a program to reduce GHG emissions generated by employees commuting to work	20	9,0	MDDEP / MTQ
<b>Sub-total</b>	<b>13 380</b>	<b>1 286,4</b>	

1) All measures that have no allocated costs are funded from within the regular budgets of ministries and organizations or through the Québec Energy Strategy.  
2) Evaluations of potential reduction and avoidance are presented only as indications and should be taken as forecasts.





<b>Awareness measures</b>		<b>Reduction / avoidance potential total for 2012 (kt \$)</b>	<b>Total cost of actions for the 2006-2012 period (M \$)</b>	<b>Responsible ministries / organizations</b>
18.	Support a variety of public awareness and partnership initiatives	100	31,5	MDDEP
19.	Implement a training program for Québec enterprises and organizations on various systems of CO <sub>2</sub> credits	-	3,0	MDEIE
<b>Sub-total</b>		<b>100</b>	<b>34,5</b>	
<b>Research, development and technology deployment</b>			<b>Total cost of actions for the 2006-2012 period</b>	<b>Ministères / organismes responsables</b>
20.	Implement a program to support technological research and innovation for the reduction and sequestration of GHGs	1 100	135,0	AEE, MDDEP, MDEIE, MRNF
<b>Sub-total</b>		<b>1 100</b>	<b>135,0</b>	
<b>Adaptation measures</b>			<b>Total cost of actions for the 2006-2012 period</b>	<b>Responsible ministries / organizations</b>
21.	Set up mechanisms to prevent and mitigate the impact of climate change on health and public security	-	34,0	MSP, MSSS
22.	Consolidate climate, hydric, subterranean water resource and air quality monitoring networks	-	24,0	MDDEP
23.	Perform various evaluations and research related to permafrost thawing, problems of coastline erosion and adapting to the impacts of these climate changes	-	6,6	MTQ
24.	Determine the vulnerability of Québec forests and the forest sector to climate change and incorporate the anticipated effects of these changes into forest management	-	6,0	MRNF
25.	Reinforce water and air quality management procedures	-	12,4	MDDEP
26.	Support the Ouranos Consortium program	-	10,0	MDDEP
<b>Sub-total</b>			<b>93,0</b>	
			<b>Total cost of actions for the 2006-2012 period (M \$)</b>	<b>Responsible ministries / organizations</b>
Costs related to coordinating the implementation of program measures, development and follow-up of funding and accounting mechanisms.		-	1,0	MDDEP
<b>Sub-total</b>			<b>1,0</b>	
<b>TOTAL</b>		<b>14 580</b>	<b>1 549,9</b>	



## APPENDIX 2

### ADDITIONAL MEASURES IN THE FIGHT AGAINST CLIMATE CHANGE

<b>Additional Measures in the Fight Against Climate Change</b>	<b>Government Financing (M \$)</b>	<b>Responsible Ministries/ Agencies</b>
Other measures of the Québec Public Transit Policy	3 700	MTQ
ClimatSol program	50	MDDEP
Clean technologies risk capital fund (Cycle Capital Fonds 1)	25	MDEIE
Heavy-duty vehicle inspection and maintenance program	N/A	MDDEP
Energy Efficiency Master Plan	N/A	AEE
Hybrid vehicle purchase tax refund of \$2000 (6 litres and less per 100 km)	N/A	MRQ
Amendment to the Highway Safety Code authorizing new vehicle pilot project road network access, including electric vehicles	N/A	MTQ
Preventive action framework for natural disasters	55	MSP
Regulation respecting mandatory reporting of certain emissions of contaminants into the atmosphere	NA	MDDEP



# ADDENDA

## REVISED BUDGETS FOR CERTAIN MEASURES

<b>Reduction or avoidance actions (1)</b>		<b>Total cost of actions for the 2006-2012 period(M\$)</b>	<b>Responsible ministries / organizations</b>
1.	Implement a financing program aimed at energy efficiency for individuals, industries, institutions, companies and municipalities in Québec	207,0	AEE
2.	Amend Québec's Building Code to improve energy performance of new buildings and homes built in Québec	4,5	AEE, RBQ
3.	Utilize the necessary mechanisms to require manufacturers of light-duty vehicles sold in Québec to meet a GHG emissions standard starting in 2010	-	MDDEP
4.	Aim to have gasoline distributors include a minimum of 5% ethanol in their total fuel sales by 2012	30,0	MRNF
5.	Support municipalities taking GHG emission inventories and action on climate change and in adopting regulations to offset the effects of idling motors	16,2	MDDEP
6.	Encourage the development and use of public transit	731,8	MTQ
7.	Encourage the development and use of transportation alternatives	46,8	MTQ
8.	Encourage the implementation of multi-modal marine and rail transport projects	60,0	MTQ
9.	Implement a government support program to improve energy efficiency in road, rail and marine transport	46,4	MTQ,AEE
10.	Adopt a regulation requiring mandatory use of speed limiting devices on all trucks and setting the maximum speed for these vehicles at 105 Km/hr	-	MTQ
11.	Reduce GHG emissions in Québec's industrial sector	7,0	MDDEP
12.	Implement the Regulation respecting halocarbons	-	MDDEP
13.	Implement the Regulation respecting the landfilling and incineration of residual materials (REIMR)	-	MDDEP
14.	Financially support the capture and incineration or valorization of biogas generated by landfill sites not so required within the framework of the REIMR	20,00	MDDEP
15.	Set up support programs to reduce GHG emissions in the agricultural, agro-food, forest and municipal sectors	112,0	AEE, MAPAQ, MDDEP, MDEIE, MRNF
16.	By 2010, improve the energy efficiency of public buildings by 10% to 14% below the 2003 and reduce fuel consumption of government departments and public organizations by 20%	0,3	AEE
17.	Require each government department to develop a program to reduce GHG emissions generated by employees commuting to work	9,0	MDDEP, MTQ
<b>Sub-total</b>		<b>1 291,0</b>	

1) All measures that have no allocated costs are funded from within the regular budgets of ministries and organizations.



<b>Reduction or avoidance actions (1)</b>		<b>Total cost of actions for the 2006-2012 period(M\$)</b>	<b>Responsible ministries / organizations</b>
18.	Support a variety of public awareness and partnership initiatives	46,5	MDDEP
19.	Implement a training program for Québec enterprises and organizations on various systems of CO <sub>2</sub> credits	3,0	MDEIE
Sub-total		49,5	
<b>Research, development and technology deployment</b>		<b>Total cost of actions for the 2006-2012 period(M\$)</b>	<b>Responsible ministries / organizations</b>
20.	Set up programs to support research, development and deployment of new technologies aimed at reducing and sequestering GHG	137,0	AEE, MDDEP, MDEIE, MRNF
Sub-total		137,0	
<b>Adaptation measures</b>		<b>Total cost of actions for the 2006-2012 period(M\$)</b>	<b>Responsible ministries / organizations</b>
21.	Set up mechanisms to prevent and mitigate the impact of climate change on health and public security	35,2	MSP, MSSS
22.	Consolidate climate, hydric, subterranean water resource and air quality monitoring networks	25,2	MDDEP
23.	Perform various evaluations and research related to permafrost thawing, problems of coastline erosion and adapting to the impacts of these climate changes	6,6	MTQ
24.	Determine the vulnerability of Québec forests and the forest sector to climate change and incorporate the anticipated effects of these changes into forest management	6,0	MRNF
25.	Reinforce water and air quality management procedures	16,0	MDDEP
26.	Support the Ouranos Consortium program	10,0	MDDEP
Sub-total		99,0	
		<b>Total cost of actions for the 2006-2012 period(M\$)</b>	<b>Responsible ministries / organizations</b>
Costs related to coordinating the implementation of program measures, development and follow-up of funding and accounting mechanisms		4,1	MDDEP
Sub-total		4,1	
<b>Total</b>		<b>1 580,6</b>	

1) All measures that have no allocated costs are funded from within the regular budgets of ministries and organizations.





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